

Spaceport News

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Deep space missions on docket



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U.S. astronauts join Hall of Fame



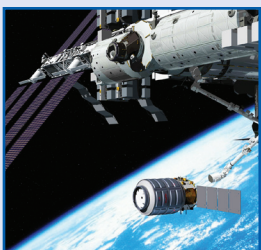
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Endeavour undergoes final powerdown



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Station resupply a way of life



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VAB undergoes major renovations

By Steven Siceloff
Spaceport News

The Vehicle Assembly Building at Kennedy Space Center has been a landmark to the technological advancements of sending men to the moon and astronauts into space for more than 45 years. But the VAB, as it is best known, is due for major renovations to continue processing launch vehicles and support the subsequent launching of a new generation of astronauts into orbit and deeper into space than ever before.

"This is home improvement, VAB style," said Jose Lopez, who is managing the effort to refurbish a structure that was once the biggest in the world. "We're going for more flexibility and reliabil-

ity with modern equipment. That building has many systems that haven't been touched up since it was built (in 1965)."

Although the work is massive simply because of the scale of the VAB, Lopez said now is the time to do it and take advantage of the pause in rocket processing that is to end in a couple years.

"When the shuttle program was in place, you couldn't take down the cranes for a long period of time, or take on heavy infrastructure projects," Lopez said.

Before another generation of rocket processing kicks in, Lopez said, the VAB must be outfitted with everything it needs to host these rockets and spacecraft assembly for another 40 years.



CLICK ON PHOTO

NASA/Jim Grossmann

Workers pull large bundles of cable from inside the Vehicle Assembly Building on April 27 to make room for new lines, including a much smaller fiber-optic infrastructure. More than 50 miles of cabling will be taken out during the work. For more Kennedy Space Center photos, click on the photo.

The effort will touch most areas of the architectural behemoth in one way or other. For instance, High Bay 3 will see the seven work platforms designed for the

Apollo/Saturn V removed. In their place will be a series of 10 platforms that can be relocated and fitted with inserts

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SpaceX manifest includes student experiments, meals

By Steven Siceloff
Spaceport News

The Dragon spacecraft built by SpaceX will head to the International Space Station during its demonstration mission with about 1,200 pounds of cargo, including commemorative patches and pins, 162 meals and a collection

of student experiments.

Since the company's rocket and spacecraft are conducting a test flight, the manifest attests to important goods for the station's crew of astronauts and cosmonauts, but not mission-critical items.

A successful flight, scheduled for lift off from Cape Canaveral Air Force Station, Fla., at 4:55 a.m. EDT on May 19, is expected to lead to regular cargo missions that will carry a wider range of goods to the orbiting laboratory. Hawthorne, California-based SpaceX, formally known as Space Exploration Technologies, also is deep into the work required

Launch update

As of press time, the launch of the SpaceX Falcon 9 was scheduled for May 19. For complete coverage and photos, go to www.nasa.gov.

For more about the Commercial Orbital Transportation Services (COTS), go to www.nasa.gov/cots.

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CLICK ON PHOTO

NASA/Jim Grossmann

In a processing hangar at Space Launch Complex-40 on Cape Canaveral Air Force Station, a cargo bag slides through the docking ring into SpaceX's Dragon capsule on April 4. For more information, click on the photo.



Space Launch System making leaps toward Mars

By **Steven Siceloff**
Spaceport News

The Space Launch System is on track to give America the launch vehicle it will need to send humans deeper into space than ever before, the program's manager said May 8.

Speaking to the National Space Club during a luncheon near Kennedy Space Center, Todd May, SLS program manager, said an uncrewed test flight of the Orion spacecraft in 2014, SLS mission in 2017 and a 10- to 14-day mission with astronauts going to the moon and back in 2021 will leave the nation in a position to explore as far as it wishes.

"By that point, you'll have the capability to go anywhere in the solar system people want to go," May said. May leads a team of engineers and designers at NASA's Marshall Space Flight Center in Huntsville, Ala. "The ultimate goal is to put human boots on Mars."

Kennedy designers also are at work to make a place to assemble and launch the SLS. Launch Pad 39B has seen significant changes and the Vehicle Assembly Building is undergoing modernizations to host the 36-story-tall SLS. Also, the mobile launcher that will hold the rocket and its servicing connections already has conducted a test at the pad.

A test version of the Orion capsule

is inside Kennedy's Operations and Checkout Building and the spacecraft that will make the first test flight into space is expected in a couple of months. It will undergo final assembly at Kennedy before being mounted atop a Delta IV rocket for a mission without astronauts aboard to test the spacecraft's systems and heat shield.

There's a lot going on," said Scott Colloredo, chief architect of the Ground Systems Development and Operations Program. "Whenever you see hardware moving in the direction of the launch pad, that's always significant."

Many elements of the SLS itself already are in testing, including the engines and solid rocket boosters that will give the rocket about 8 million pounds of thrust at launch, 10 percent more than the Saturn V.

NASA already has an inventory of space shuttle main engines that will be used to power the core stage. "The propulsion elements are in really good shape," May said. "Sixteen space shuttle main engines, that's a good head start."

The SLS also will use solid rocket boosters like the shuttle, but the SLS versions will be five segments instead of four.

The core stage, which will hold the fuel tanks for the main engines, is early in its design but still is on schedule. Like the space shuttle



NASA/Kim Shiflett

Space Launch System Program Manager Todd May addresses the National Space Club's Florida Committee during the organization's monthly luncheon in Cocoa Beach, Fla., on May 8.

external tanks, the core stage will be built at NASA's Michoud Assembly Facility in Louisiana. The SLS stage is about 15 feet longer than the shuttle's external tank, and it will be shipped to Kennedy on the Pegasus barge, another element shared with the shuttle.

The stage, complete with the space shuttle main engines on the bottom, will be shipped to NASA's Stennis Space Center in Mississippi in early 2016 for six months of tests. Then it will come to Florida that summer where it will be stacked inside the

Vehicle Assembly Building into the full rocket that will launch at the end of 2017.

May said using shuttle components where possible saved considerable design and development costs. Also, NASA is counting on savings from modern manufacturing processes and has cut the agency's oversight requirements to further save money and time.

"We understand we've got to do things differently than in the past," May said.

The SLS is slated to be America's biggest rocket ever, even surpassing the Saturn V that lofted astronauts and their spacecraft to the moon in the late '60s and early '70s. For the SLS, astronauts will fly inside an Orion capsule reminiscent of the Apollo capsules, though much larger.

To get anywhere on an SLS still requires considerable work, although the team is making steady progress. The focus now is on the version of the SLS designed to lift 70 tons into space, strong enough to send the Orion spacecraft to the moon. Later versions are expected to launch 130 tons, enough to carry landers or other spacecraft suited for whatever location astronauts head to.

"NASA hits something that speaks to the inside of all of us, the exploration," May said. "It's great to do things that speak to all of humankind."

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to make Dragon suitable to carry people into orbit.

The mission is a landmark because it is the first time a privately built spacecraft will head to the International Space Station. The flight, which includes no crew members other than those already on the station who will guide Dragon's arrival, carries enormous challenges and involves numerous individual evaluations.

Most of the cargo's weight, 674 pounds, is in food and crew provisions, including the meals, crew clothing, batteries and other pantry items. A laptop and its ac-

companying accessories also will make the journey.

Tucked inside the Dragon capsule are two NanoRacks dedicated to student experiments that will study a range of microgravity-related areas from microbial growth to water purification.

The mission calls for the 18-foot-high Dragon to approach the station after its sensors and navigation systems are checked out thoroughly. The spacecraft will go through numerous tests during the third day of the flight as it passes within about 1.5 miles of the station. Communications networks from the spacecraft to the station will be evaluated

during this phase, too.

On the fourth day of the mission, the spacecraft will perform a methodical approach to the space station. It first will fly around the station at more than 6.2 miles and then fly under it no closer than 1.6 miles. With navigation units on the spacecraft and station relaying information, the Dragon will approach slowly from beneath the station, pausing at several stages as systems are continually checked.

The crew aboard the station will take command of Dragon briefly to test the capsule's ability to retreat from the area.

The spacecraft later will

move to a position about 700 feet from the station so controllers can determine whether it is safe to allow a closer rendezvous.

Assuming a "go" is given, the Dragon will close to within 98 feet of the station and pause again. The next step will bring Dragon to about 32 feet from the station, within reach of the robotic arm. Expedition 31 crewmember Don Pettit will steer the arm to latch onto the cargo craft and connect it to the Harmony module.

The station crew will unpack the Dragon during the next two weeks and load Dragon with more than 1,400 pounds of used scien-

tific and spacewalking gear. Dragon then will be removed from the station by the arm and released to fly back to Earth.

Unlike the other cargo vehicles that resupply the station, the SpaceX craft is designed to return to Earth safely instead of burning up in the atmosphere. That means experiments and other equipment can be stowed inside the capsule and returned to scientists.

SpaceX and Orbital Sciences Corp. are conducting demonstration missions under NASA's Commercial Orbital Transportation Services contract, known as COTS.



Shuttle astronauts join ranks of fellow hall of famers

By Linda Herridge
Spaceport News

Three space explorers were inducted into the Astronaut Hall of Fame during a ceremony at the Kennedy Space Center Visitor Complex (KSCVC) in Florida on May 5. Franklin R. Chang-Díaz, Air Force Gen. Kevin P. Chilton and Charlie Precourt became the 11th group of space shuttle astronauts to join the ranks of the distinguished members of the Hall of Fame.

KSCVC Chief Operating Officer William Moore welcomed guests to the visitor complex and said it is a privilege to host the induction ceremony where so many astronaut heroes gather each year to recognize and welcome a chosen few into the ranks of this elite group of space explorers.

John Zarrella, CNN's principal correspondent for coverage of NASA's space



NASA/Jim Grossmann

John Zarrella, CNN's principal correspondent for coverage of NASA's space program, introduces the 2012 U.S. Astronaut Hall of Fame inductees, from left, Franklin Chang-Díaz, Kevin Chilton and Charlie Precourt, at the Kennedy Space Center Visitor Complex on May 5. For more Kennedy photos, click on the photo.

program, served as Master of Ceremonies and introduced the attending members of the U.S. Astronaut Hall of Fame as they came forward and took their seats on the stage.

Hall of Famer and Kennedy Space Center Director Bob Cabana said it's great to have Chang-Díaz, Chilton and Precourt, three outstanding inductees, back in Florida.

"My sincere congratula-

tions on a well-deserved honor," Cabana said.

"In spite of what some of you may have heard, the ending of the shuttle program has not ended human spaceflight at NASA, and Kennedy is not shutting down," Cabana said. "We continue to make great strides in becoming a multiuser government and commercial spaceport of the future.

"Our path forward continues to be challenging, but the Kennedy team is definitely up to the challenge and I know we're going to excel," Cabana said.

Hall of Famer George "Pinky" Nelson introduced Chang-Díaz by saying he has continued to push the envelope.

"You've done incredible things and I really believe that your biggest impact is

yet to come," Nelson said.

"I'm a product of two cultures and this honor here has a special meaning to me because it's given by those who have always been my heroes," Chang-Díaz said. "The folks here are the people that I looked up to.

"Today, I'm most thankful to this great nation that 1968 opened the doors for me, a

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designed for processing different kinds of rockets.

Like everything else inside the VAB, the platforms are not run-of-the-mill items. They are expected to weigh about 90,000 pounds and be outfitted with commodities essential for rockets, such as nitrogen and helium along with electrical and networking cables.

Simply put, no longer will a high bay be suitable for only one kind of rocket design.

"If you can fit in the big rocket, you can definitely fit in the smaller rockets," Lopez said.

The VAB is slated to host NASA's Space Launch System, or SLS, as it is readied for test flights in 2017 and 2021. The SLS will rival the Saturn V for sheer size and power and is designed for several variations that the platforms would have to accommodate. Commercial companies with much smaller rockets also are expected to use the VAB's unique facilities.

"The main thing we're doing there is an evolvable approach where we can handle any one of these SLS vehicles, but also handle any of the commercial vehicles," said Scott Colloredo, chief architect of the Ground Systems Development and Operations Program that is overseeing the VAB modifications. "By supporting one, it helps us to support the other."

The five primary overhead cranes in the VAB will see their antiquated control systems modernized, too. The cranes, anchored to the VAB's framework at the top of the structure, were used to lift the shuttles and rocket stages from the floor of the transfer aisle to their place on the launch platforms. They routinely hoisted the 100-ton shuttles more than 16 stories off the ground safely and lowered them onto the side of the external fuel tank for launch.

Two of the cranes can lift 325 tons, another two are rated for 250-ton loads and the fifth one is designed to hold 175 tons. They will be crucial again in the future to stack the SLS

components into a launch configuration.

The doors, the largest in the world, are due for new braking systems and other modifications that will reduce wear-and-tear on the tracks and systems.

The renovation calls for removing a great deal of the infrastructure inside the VAB, some of which was installed when the structure was built in 1965. New systems, all up to modern building and safety codes, are to be installed.

More than 50 miles of Apollo-era cabling will be removed during the work and replaced with modern lines. About 70,000 feet of cabling already has come out. In some cases, that means replacing thick bundles of copper wiring with a few fiber-optic lines no wider than a pinky finger.

The fire suppression system has corroded in many important areas and is not big enough under current regulations. So its vast network of pipes, spigots and pumps, will be taken out entirely beginning next year and replaced with new equip-

ment and piping. The work should be finished by the end of 2014, Lopez said.

There is plenty of evidence that other water and drainage pipes in the VAB also are corroding, so they will be replaced, along with boilers and chillers that feed hot and cold water into the facility.

Battery backups for the electrical system also are slated for replacement.

The renovation is focusing on the building's interior systems, but the building itself is in very good shape.

The work would have had to be done at some point soon whether rockets were being processed or not, Lopez said. Doing it all while keeping the structure's systems up and able to handle normal processing demands would have been an exceptional and expensive challenge, though.

Lopez said, "It would have been like putting a new car engine in your trunk while keeping the same engine in the front still going."



Scenes Around Kennedy Space Center



NASA/Jim Grossmann

Dr. LaNetra C. Tate (center), materials engineer at Kennedy Space Center, is surrounded by students as she welcomes them for their tour of the Space Life Sciences Lab facilities on April 12. The 26 honor students in chemistry and biology and their teachers got a chance to visit some high-tech labs at Kennedy as part of an effort to encourage students in the areas of math, science, technology and engineering. The tenth and eleventh grade students from Terry Parker High School in Jacksonville, Fla., also visited labs in the Operations and Checkout Building during their one-day tour. The group's visit to Kennedy was hosted by the Education Office as part of a nationwide effort by the National Lab Network to help introduce the nation's students to science careers.



NASA/Frankie Martin

After 14 years of providing food service to Kennedy Space Center, Randall Crosby, center, and his wife, Patty, left, say farewell to friends and co-workers in Headquarters on May 10. Crosby, a representative with the Florida Division of Blind Services, was the owner of Crosby Snacks on the third floor of Headquarters.



NASA/Jim Grossmann

NASA's Mobile Aerospace Reconnaissance System, or MARS, is secured aboard NASA's Freedom Star ship near Hangar AE at Cape Canaveral Air Force Station on April 9. With its spatial, hyperspectral, thermal and directed energy capabilities, MARS will be used for thermal imaging testing for the upcoming SpaceX Falcon 9 and Dragon capsule demonstration flight to the International Space Station.

Shuttle team conducts final heartfelt powerdown

By Steven Sicheloff
Spaceport News

Technicians working inside space shuttle Endeavour's flight deck and controllers stationed in the Launch Control Center turned the lights out on the last powered shuttle May 11 as they switched off Endeavour's displays and systems for the final time.

"It is with a great sense of sadness that we say good-night to Endeavour, and to the Space Shuttle Program as a whole today," said Mike Ciannilli, a NASA test director who stood at the integration console in Firing Room 3 during the procedure. "It is with a great sense of pride that we recognize the contributions of this amazing team over the last 30 years. And it is with a heartfelt 'thank you' to the

American people for the honor of launching this vehicle 135 times, to not only explore outer space, but to make life better on Earth. Good night, Endeavour."

The work was a milestone for the shuttle's retirement as crews at Kennedy Space Center continue to make the spacecraft suitable for a museum career.

Endeavour's powerdown, which is the process controllers follow to stop the electricity flow into the shuttle, came almost 20 years to the day of the spacecraft's first launch on May 7, 1992. As NASA's youngest shuttle, Endeavour flew 25 times. Its crews posted notable accomplishments, including capturing and redeploying a stranded communications satellite during that first flight, flying the first construction mission of the International

Space Station and conducting the landmark mission to repair NASA's Hubble Space Telescope.

"I'd like to dedicate this powerdown to those who are not so fortunate to be here today, to those who gave their blood, sweat and heart to the program," said Walter "Buddy" McKenzie of United Space Alliance.

With that, some of the same people who ran endless checklists to make sure Endeavour was ready for space ran through a checklist in reverse to take key systems offline in careful order. When they finished, Endeavour's cockpit was lit only by work lights plugged in outside the shuttle.

Discovery and Atlantis went through the same steps earlier as they also were readied for public display.

Several steps remain before Endeavour will be



NASA/Ben Smegelsky

United Space Alliance associate operations chief Pat Leslie toggles the switches to turn off consoles on space shuttle Endeavour's flight deck for the final time during operations to power down the shuttle May 11.

ready to leave Kennedy for its new home at the California Science Center in Los Angeles. The payload bay doors must be closed permanently, three replica space shuttle main engines will be installed and the hatch to the crew compartment will be closed.

When that work is completed, an aerodynamic tail cone will be bolted over the engines and Endeavour will be mounted atop NASA's Shuttle Carrier Aircraft.

The flight to the west coast is expected in September and will take several days.



Co-ops showcase lessons learned outside classroom

By Brittney Longley
Spaceport News

Famous for his rise from an engineer to corporate director and president of Kaiser Aerospace and Electronics Corp., Clay P. Bedford once said, "You can teach a student a lesson for a day, but if you can teach him to learn by creating curiosity, he will continue the learning process as long as he lives."

Seven cooperative education (co-op) students showcased the results of their curiosity during the 2012 spring co-op showcase at the Kennedy Learning Institute (KLI) on May 3.

To be eligible for full-time employment, co-op students coming to Kennedy Space Center after January 2012 must present a project with which they have been tasked to their fellow co-ops, men-



NASA/Charisse Nahser

Co-op student Prital Thakrar, of University of Florida, shares her experience in operations processing within safety engineering with fellow co-ops and management teams May 3 at the Kennedy Learning Institute.

tors from their organization, the coordinators of the co-op program, and a representative from Kennedy's executive staff.

"What we learn in class, we often sit and wonder how we are going to apply it, and here, we see exactly what our professors are talking

about," said co-op student Laura Midulla.

The co-ops worked on projects from a new handbook for incoming co-ops to a Vehicle Assembly Building (VAB) interface study, which is the study of the climate in the VAB.

Kennedy Director Bob

Cabana was present at the showcase to see how the students applied their classroom skills to real world objectives.

"I know you learned something, but the real question is did you have fun?" asked Cabana. "We make the center a great place to

work because of the people here. We are making great strides and progress continually and you are part of that."

Cabana encouraged the co-ops to continue their hard work: "Keep doing what you are doing. You are the future for Kennedy Space Center."

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dreamer that came to the shores of this country, and this country opened the doors to the land of opportunity, to the American dream. I can say that I have fulfilled that dream," Chang-Diaz said.

Chang-Diaz served in the astronaut program for 25 years and became one of only two astronauts to fly on seven space shuttle missions. His missions were STS 61-C, STS-34, STS-46, STS-60, STS-75, STS-91 and STS-111.

He logged more than 1,600 hours in space, including 19 hours and 31 minutes during three spacewalks. He helped deploy the SATCOM KU satellite, the European Retrieable Carrier, the Tethered Satellite System, the Space Habitation Module-2, and the Galileo spacecraft on its journey to Jupiter.

On his final mission, STS-111, he installed the mobile base system on the International Space Station and replaced the failed wrist joint on Canadarm 2.

In 2005, Chang-Diaz retired from NASA and established the Ad Astra

Rocket Company, which is dedicated to the development of advanced plasma rocket propulsion technology.

Hall of Famer Dan Brandenstein introduced Chilton by reviewing his career in NASA and the U.S Air Force.

"Throughout his career, he demonstrated exceptional intelligence, unparalleled devotion to duty and visionary planning," Brandenstein said. "I am honored to welcome the newest member of the Astronaut Hall of Fame."

"Thank you so much for this wonderful honor," Chilton said.

Chilton is a three-time space shuttle astronaut with more than 700 hours in space. He served as pilot on STS-49, the maiden voyage of space shuttle Endeavour, and STS-59, which featured the deployment of the Space Radar Laboratory. He served as the commander of STS-76 on the third docking mission to the Russian space station Mir, as well as the first spacewalk from the space shuttle while docked to Mir.

Hall of Famer Robert "Hoot" Gibson introduced Precourt and talked about learning Russian in order to

prepare for his first mission to the Mir space station.

"After working with him and getting to know him, I said I would be really surprised if he isn't the chief astronaut one day," Gibson said. "After four brilliant missions and three times going to Mir, including the very last docking in 1998, Charlie became the chief astronaut.

"He has gone right to the very top in everything he's ever done. Congratulations, Charlie, and welcome to the Astronaut Hall of Fame," Gibson said.

"This is a tremendous honor," Precourt said. "It's obviously very humbling, and I'm just really thrilled to be here today.

"We've had opportunities in the space program that go beyond our wildest dreams, and I'm very, very thrilled in particular that this represents the work of the Astronaut Scholarship Foundation, who is paying it back, and we get to be a part of that for the students. Education is so critical."

Precourt served in the space program for 15 years and was a mission specialist on STS-55, pilot on STS-

71, and commander on STS-84 and STS-91. During those missions, he logged a total of 932 hours in space.

During the STS-91 mission, which was the ninth and final Shuttle-Mir docking mission, the crew also conducted the Alpha Magnetic Spectrometer experiment, which involved first-of-its-kind research on antimatter in space.

Precourt left NASA in 2005 and currently serves as general manager and vice president of Space Launch Systems for ATK Aerospace Systems of Magna, Utah.

According to Astronaut Scholarship Foundation Chairman and Hall of Fame astronaut Charlie Duke, the ASF was founded in 1984 by the six surviving members of America's original Mercury 7 astronauts. The foundation distributes 28, \$10,000 scholarships annually and has awarded nearly \$3.5 million since its inception.

ASF scholarships are the largest monetary award given in the United States to science and engineering students at the undergraduate level based solely on merit.



Event highlights Asian-Pacific American heritage

By Linda Herridge
Spaceport News

Learning to take risks and overcoming the fear of rejection were two key points that Gwendolyn Young, director for Mission Support at NASA's Dryden Flight Research Center in Edwards, Calif., covered in her presentation to workers during the Asian-Pacific American heritage month event in Kennedy Space Center's Training Auditorium on May 10.

Hosted by the center's Asian-Pacific American Connection (APAC), this year's theme is "Striving for Excellence in Leadership, Diversity and Inclusion."

"I appreciate the culture of hard work and perseverance of the Asian-Pacific American workers here at Kennedy Space Center," said



NASA/Ben Smegelsky

Asian-Pacific American Connection Chairperson Lien Moore, right, talks with participants during the APAC Heritage Month event, May 10, at the Training Auditorium at Kennedy Space Center in Florida.

Center Director Bob Cabana during opening remarks.

Young, who has worked for NASA for 29 years, described some unusual challenges she overcame to achieve her current leadership position. She said the struggle encouraged her to do her best on her life's journey and to strive to influence others regardless of their backgrounds.

"My story of how I came to NASA is one of over-

coming failures and disappointment," Young said. "I think people should prepare themselves for failure."

"Failure is the doorstep to success. You have to fail, otherwise, you're never going to learn anything," Young said. "And I'm reminded of something that Jerry West of the Los Angeles Lakers said, 'Every time I hit the lowest point, I've risen to the highest'."

Young asked the audience,

"Is there something you've always wanted to try, some program you wanted to apply for, a job you've always wanted? If there is, take a chance and go for it. There are people along the way to help – your supervisor, a co-worker, a friend, a mentor."

"I am incredibly proud of the APAC team and our accomplishments in the areas of leadership development, recruitment and outreach," said Josie Burnett, director of ISS Ground Processing and Research. "This year was a great year, and we have many more to look forward to as Kennedy becomes a multi-user launch complex."

APAC Chairperson Lien Moore said the main goal is to help raise awareness that there is a large group of Asian-Pacific Americans (APAs) at Kennedy that con-

tribute to NASA's mission.

"APAs make significant contributions in the work place at Kennedy, across all disciplines and organizations," Moore said. "Our goal is to enhance the contributions of our members to the extended community of NASA, Kennedy, Brevard County and Central Florida."

"We have found that when we reach out to the community as volunteers, mentors and spokespersons, we begin to thrive, as opposed to simply surviving," Moore said. "The Kennedy management has been very supportive in this area, providing opportunities and encouragement for personal and community growth."

Moore added, "If you want to learn a subject, study; if you want to master a subject, teach it."

Top high school students treated to day at Kennedy

By Linda Herridge
Spaceport News

Graduating top seniors from Brevard County high schools toured Kennedy Space Center and heard about NASA's past, present and future during the first Brevard Top Scholars Day, May 11.

Kennedy's Office of Education coordinated the event that featured a tour of Launch Complex 39, including the Vehicle Assembly Building, and viewing of space shuttle Atlantis in its orbiter processing facility.

Chief of the Education Programs Division Hortense Diggs welcomed the students to the center and congratulated them on their achievements.

"Our nation needs scientists and engineers," Diggs said. "I hope each of you will consider pursuing a career in science, technology, engineering and mathematics, or STEM, fields of study because it is these occupations that will matter most in the 21st century."



NASA

Students from Brevard County high schools gathered for a group photo in front of the Headquarters Building at Kennedy Space Center, May 11, during the Brevard Top Scholars Day sponsored by the center's Office of Education. At right is Education Project Manager Theresa Martinez, and at left is Education Specialist Rachel Prieth-Abrahams.

Kelvin Manning, Kennedy associate director, officially welcomed the students to the center.

"In this country we recognize the athletes and the entertainers and academics are kind of pushed off to the side," Manning said. "But I'd like to congratulate you on your achievements and emphasize that STEM fields are very important for all of us to keep moving forward as a nation."

"We need to focus more on the technical fields, and that's what we

do here at NASA," Manning said.

Russell Romanella, director of Kennedy's Safety and Mission Assurance gave a presentation on NASA's past, present and future in space exploration.

During lunch at the Kennedy Space Center Visitor Complex, the students heard from Applied Physics Lab Branch Chief Stan Starr from the Engineering Directorate.

Starr talked about the center's labs and some space shuttle-related

problems that were solved.

Chris from Heritage High School in Palm Bay said the tour and presentation were very informative.

"We got to experience things that even some Kennedy employees have not had the opportunity to do. I'm glad to have had the opportunity," Chris said. He plans to pursue a degree in electrical engineering from Florida Institute of Technology in Melbourne.

Eau Gallie High School student Jessica said she really liked the day's experience.

"I really liked Russell's presentation," Jessica said. She may pursue a career in medicine.

Nicholas, a senior from Space Coast High School in Port St. John, is planning to pursue a degree in civil engineering from Florida Tech.

"The tour was one of my favorites," Nicholas said. "I've always had an interest in the space program, but now it interests me even more."

At the end of the day, each student received a certificate acknowledging his or her attendance at the event.



Remembering Our Heritage

Station resupply important to Kennedy's past and future

By Kay Grinter
Reference Librarian

Humans are by nature consumers, regardless of where they might live and work. Supply runs to the International Space Station began as soon as assembly got under way.

The first supplies were delivered in May 1999 aboard space shuttle Discovery during the STS-96 mission, the first shuttle docking to the fledgling station.

The station, or ISS, was merely the Russian Zarya control module mated to the U.S. Unity Node 1 connecting module, a far cry from the orbiting laboratory now the size of a five-bedroom house. Node 1 was delivered by the STS-88 crew, which included Kennedy Space Center Director Bob Cabana.

The STS-96 crew dropped off the Orbital Transfer Device, a U.S.-built crane, and parts of the Russian crane Strela, as well as 3,567 pounds of "material," which included clothing, sleeping bags, spare parts, medical equipment, supplies, hardware and about 85 gallons of water in anticipation of the needs of the station's future "consumers," soon to be arriving in the form of international Expedition crews.

With the end of the Space

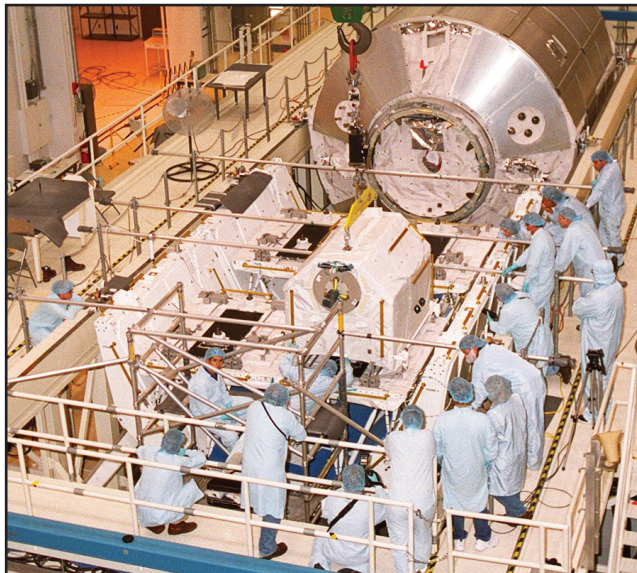
Shuttle Program in sight, NASA's partners renewed their commitment to space-based research by providing other resupply methods.

The station currently is replenished by the Russian Progress resupply vehicle, the Japanese H-II Transfer Vehicle (HTV) and the European Automated Transfer Vehicle (ATV).

The Progress, launched from the Baikonur Cosmodrome in Kazakhstan on a Soyuz rocket, is an automated, unpiloted version of the Soyuz spacecraft capable of delivering supplies and fuel tanks. The Progress also has the ability to raise the station's altitude and control the orientation of the station using the vehicle's thrusters.

The HTV, launched from the Tanegashima Space Center in Japan on an H-IIB rocket, is the only resupply vehicle also capable of delivering external unpresurized cargo to the station since the shuttle's retirement. The cargo is mounted to an exposed pallet that sits within the HTV's unpresurized section.

The ATV, about the size of a traditional London double-decker bus, became the largest and heaviest vehicle supplying the station after the shuttle's retirement in 2011. Launched from



NASA file/2001

Workers check out the placement of one of four gas tanks on the Spacelab Logistics Double Pallet in the Operations and Checkout Building on May 7, 2001. Part of the STS-104 payload, the two gaseous oxygen and two gaseous nitrogen storage tanks comprised the high pressure gas assembly that was attached to the International Space Station's Joint Airlock Module during two spacewalks. The tanks supported spacewalk operations from the station and augmented the Service Module gas resupply system.

the Guiana Space Centre in Kourou, French Guiana, on Ariane 5 rockets, the ATV can carry almost three times the amount of fuel as a Progress.

However, NASA soon will become the primary provider of oxygen and nitrogen to the station with the development of the Nitrogen Oxygen Recharge System (NORS), a component of NASA's Orbital Replacement Unit (ORU) Project. Primary responsibility for launch preparations of this ORU Project is assigned to Kennedy's ISS Ground Processing and Research Project Office and Ground Processing Directorate.

ORUs are modular units with quick disconnects that make them easy to replace in their entirety.

Oxygen and nitrogen is needed for replenishment of the station's cabin breathing air, as well as for operation of the airlock and the pressurized ammonia cooling systems.

"We have responsibility here at Kennedy for process-

ing of many ISS ORUs," said Steve Bigos, the project manager for ORU and NORS at Kennedy, "and the most common ORU will be the NORS Recharge Tank Assembly (RTA)."

Kennedy will fill the RTAs with oxygen or nitrogen at about 6,000 PSI and then prepare the RTA for transfer to the launch providers.

"We are currently building the support equipment required for our processing operations," Bigos said.

Although the ATV and Progress spacecraft usually transport some amount of nitrogen and oxygen on each visit to the station, most of the orbital lab's future needs will be provided by NORS RTAs.

"The NORS pressure vessels are in the manufacturing phase now," Bigos said. "The first should be delivered in October 2013."

Plans are to launch the canisters on HTVs from Tanegashima in Japan or on U.S. spacecraft under development by commercial

companies through NASA Commercial Orbital Transportation Services (COTS) agreements.

One of those is SpaceX's Dragon capsule, scheduled for its first demonstration test flight May 19 from Cape Canaveral Air Force Station.

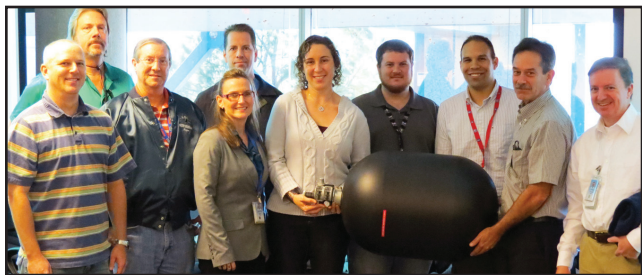
The other is Orbital Sciences' Cygnus spacecraft, which will launch from NASA's Wallops Flight Facility in Virginia. The test flight of Orbital's Antares rocket tentatively is set for this fall, with the Cygnus demonstration flight following in the winter.

"Typically, there will be one NORS vessel on every COTS flight," Bigos said, "but there could be two or three on some flights. At this time, 55 are on the NORS flight manifest, but anywhere from 100 to 200 may fly in the future."

The NORS slated on HTV missions will be prepared in Kennedy's Space Station Processing Facility and shipped to Japan for launch, accompanied by a small team from Kennedy.

Before the first NORS is ready to fly, though, Bigos and his team will be busy preparing other ORUs for flight, such as a Main Bus Switching Unit and a Utility Transfer Assembly for HTV-4.

As long as a steady flow of international researchers continues to make their way to and from the orbiting laboratory, Kennedy will be at the forefront helping to provide their basic needs.



NASA

NASA soon will become the primary provider of oxygen and nitrogen to the International Space Station and with that has come the development of the Nitrogen Oxygen Recharge System (NORS), a component of NASA's Orbital Replacement Unit (ORU) Project. Primary responsibility for launch preparations of this ORU Project is assigned to Kennedy Space Center's ISS Ground Processing and Research Project Office and Ground Processing Directorate. Here, the Kennedy team holds an engineering model of the NORS Recharge Tank Assembly (RTA) at a Johnson Space Center NORS design review.

More information

To track the COTS test flights and resupply missions to the station, visit NASA's launch schedule at

www.nasa.gov/missions/highlights/schedule.html



NASA Employees of the Month: May



NASA image

Employees for the month of May are, from left to right, Harold D. Wiedemuth, Engineering and Technology Directorate; Donald E. DeHart, Engineering and Technology Directorate; Shaqueena Lewis, Launch Services Program; John Graves, International Space Station Ground Processing and Research Project Office; and Craig Chesko, Ground Processing Directorate. Not pictured are Gordy Degear, Human Resources; James Reilly, Ground Systems Development and Operations Program; Kimberley Sweep, Procurement Directorate; and Miroslava Guisbert, Center Operations Directorate.

Looking up and ahead . . .

* All times are Eastern

2012

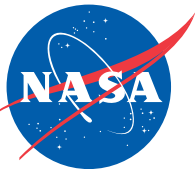
May 19	Launch/CCAFS (SLC-40): SpaceX Falcon 9, Dragon C2/C3 Launch time: 4:55 a.m.
No earlier than June 13	Launch/Reagan Test Site Kwajalein Atoll: Pegasus XL, NuSTAR Launch window: 11:30 a.m.-3:30 p.m.
Targeted for June 18	Launch/CCAFS (SLC-41): Atlas V (AV-203), NROL-38 Launch window: 4:07 to 4:27 a.m.
June 28	Launch/CCAFS (SLC-37B): Delta IV-Heavy, NROL-15 Launch window: TBD
Aug. 2	Launch/VAFB (SLC-3E): Atlas V (AV-033), NROL-36 Launch window: TBD
3rd Quarter	Launch/Wallops Flight Facility (Launch Pad 0A): Orbital Sciences Antares test flight Launch time: TBD
Aug. 23	Launch/CCAFS (SLC-41): Atlas V-401, Radiation Belt Storm Probes (RBSP) Launch window: 4:07 to 4:27 a.m.
No earlier than Sept. 20	Launch/CCAFS (SLC-37B): Delta 4, GPS 2F-3 Launch window: TBD

In celebration of Kennedy Space Center's 50th anniversary, enjoy this vintage photo . . .
FROM THE VAULT



NASA file/1991

This is the third crop of lettuce harvested for the Controlled Ecological Life Support System (CELSS) Program, an effort by NASA in the 1990s to develop bioregenerative systems that would provide required life support elements for crews on long-duration space missions or extraterrestrial planetary colonizations. Taken on Oct. 8, 1991, the lettuce is 28 days old inside the Biomass Production Chamber of Hangar L at Cape Canaveral Air Force Station.



John F. Kennedy Space Center

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